THURSDAY, AUGUST 7, 1879

SCIENCE TEACHING IN SCHOOLS

SIR JOHN LUBBOCK, one of the two or three members of Parliament who know what science means, has again brought forward his motion for the introduction of science teaching into schools. As on former occasions, the motion was lost, though those who opposed it, and especially those connected with the Education Department, were at a loss to give any clear reason for not agreeing to it. One of the chief reasons apparently why the Department is afraid to hold out inducements for the teaching of scientific subjects, is that there is scarcely an inspector qualified to examine on the subject, a humiliating revelation of the lamentable state of education at our universities. But Sir John Lubbock also pointed out another apparently trivial but really powerful reason for our half-educated rulers shrinking from assenting to the introduction of science teaching into schools; the very name "science" acts as a bugbear. It is indeed a pity we have no such word as *Naturkunde* to indicate the sort of thing—"Natural Knowledge"—that Sir John Lubbock and the intelligent minority who are with him, wish to be taught to the boys and girls of our elementary schools. The fact is that what is wanted is a knowledge of things instead of mere words; it is really a question of how to use the eyes and how to train the mind; the pages of nature as opposed to the pages of a book; in brief, education *versus* mere instruction. How deeply working men feel the want of natural knowledge when they grow up is shown by the increasing number of technical schools that are springing up, evening classes for the teaching of science, popular scientific lectures, local scientific societies, and other similar efforts to make up for a deficient education in youth. It seems simply incomprehensible how any member of Parliament having at heart the real welfare of the people, physical, intellectual, and moral, should not heartily support Sir John Lubbock's attempt to give something like reality to our elementary education. Even the opponents of the motion seem to approve of "object-lessons," ignorant that science teaching, in Sir John Lubbock's acceptation, is just the same thing "writ large,"—simply object-lessons taught by competent teachers in a systematic and accurate manner. As to the outcry against increasing the burdens of teachers and pupils, those who raised it must have known that it was quite irrelevant. The advocates of science teaching do not wish to make it an additional, but only an alternative subject, to be taken at the option of the teachers, for grammar, geography, or other existing subject, for which payment is made. For indeed already is science put down as one of the subjects in elementary schools, but only as an extra subject for which no payment will be made, and for the teaching of which, therefore, no inducement is held out to the teachers. Then as to cost, Sir John Lubbock told the House—"Contrary to what was believed in some quarters, his proposal would really not involve any appreciable cost. The little books would come to no more than those on history or grammar; while the sun, moon, and stars, rain and dew, wind and light, air and water, heat and cold, stones and flowers, were before us all: and even if a few objects as illustrations were required, they could be obtained for a few shillings. He wished for nothing difficult or abstruse, nothing beyond the range of the children's minds and daily experience. In mechanics the simple forces might be explained to them—why carts were put on wheels, how levers and pulleys acted, the use of the screw and wedge; then the nature and relative distances of the principal heavenly bodies, the primary facts relating to air and water in agricultural districts, the character of the soil, the reason for the rotation of crops, the origin and principal qualities of such substances as chalk, coal, iron, copper, &c.; the succession of the seasons, the flow of rivers, the growth of plants; the fundamental rules of health, the necessity for ventilation and cleanliness, and last, not least, the need for industry, frugality, and economy. Explanations of these simple and every-day things would be most interesting and useful to the children. So far from cramming and confusing them, you would introduce light and order into their little minds, and give them an interest in their lessons which under the present system they rarely felt."

And, as Dr. Playfair put it, of what use was it to spend a long time in teaching children in mining districts grammar? Would it not be of greater importance to teach them about the dangers they would have to meet in their calling—about fire-damp and after-damp, for instance? In the same way, should not a child destined to become an agricultural labourer be taught something about the earth, the properties of manure, and other subjects connected with cultivation?

The fact is that some means should be taken to enlighten members of Parliament themselves as to what education, as contradistinguished from instruction, and natural knowledge, as contradistinguished from book knowledge, really is; and our readers might do worse at the certainly approaching election than arouse the minds of candidates to the urgent necessity of bringing the country, in the matter of science teaching, up to the level of those countries which, by the superior knowledge of their manufacturers and technical skill of their working men, are rapidly outstripping us on our own ground.

MAUDSLEY'S "PATHOLOGY OF MIND"

The Pathology of Mind. Third Edition. By Henry Maudsley, M.D. (London: Macmillan and Co., 1879.)

GREAT as has been the growth, in recent years, of the tree of knowledge, there is no branch in which it has undergone so much actual development, as well as mere expansion, as that of psychology. Though formerly nearly isolated, being as it were but imperfectly grafted on to the main stock, curious rather than beautiful, looking irregular, dry, and withered by the blight of theology and bad metaphysics, it now presents a compact system of branches and foliage, arranged with all the symmetry of organisation; the main stem springing from the branch of biology as this does, in its turn, from that of the physical sciences; moreover, the process is still continuing, for fresh buds may be seen in the newly-formed structures, some of which, *e.g.*, sociology, philology, æsthetics, and the science of religious beliefs are already beginning to unfold. The causes of this accelerated growth it is needless here to discuss; the principal seems to be the gradually extended application of natural law

which has taken place since the impulse it received long ago from Descartes; the more immediate causes being the greater development which biology has undergone, through both induction and deduction; and especially the advances made in the physiology of the nervous system, by which a clearer understanding has been obtained of the correspondence between consciousness and bodily state. It has come to be perceived that mind, instead of being considered as a substance superadded to the body, or even as the power of consciously knowing and acting, is better regarded as the power, more extensive than the field of reflection, which highly organised beings possess, of performing their most complex actions; this regulation of action being vested in the nervous system as its peculiar function. Thus, mind appears homogeneous with life—being power similar in kind, but differing in degree of speciality. Still, the eternal mystery of the connection of consciousness with the objects of consciousness remains almost the same; the gulf still gapes widely, and cannot be bridged, though perhaps its borders may be a little more clearly defined. Also, it may still be open to discussion whether an organism possesses these remarkable powers *necessarily—i.e.*, in virtue of its organisation.

The development of the science having proceeded so far, it might be considered not unreasonable to look for fruit on it already, in the shape of immediate practical application; and the belief that this search had been successful was the *raison d'être* of the first appearance of this work, as the author explains in his preface. Certainly some may consider the fruit as yet unripe, or at any rate the seed it contains unready for germination, but this would be matter of individual taste. For it is at least extremely probable that if mind be a function of the body, its health will depend on laws and conditions similar to those of the other vital functions; and that when disordered, similar methods of restoration will be serviceable in either case. But the common psychological doctrines were, till lately, quite inadequate to show in what mental disease consisted. Certain affinities with other diseases had long been recognised, *e.g.*, its dependence upon certain general bodily states, or being induced by definite causes; also the prominent features of pain, excitability, and weakness, separately or together, frequently characterised the derangement of other functions also. The author shows that the correspondence may be traced still further: that, like many other morbid conditions, insanity consists essentially in failure to attain to, or retrograde departure from, the normal stage of development. But in one respect especially the present edition claims and is entitled to some degree of novelty, or even originality; namely, in the recognition of the particular mental faculty which suffers lesion in insanity. Until pointed out by Comte, Spencer, and Lewes, how large a proportion of our total environment is constituted by society, sufficient attention had not been paid to the extensive position occupied by that faculty of the mind employed in regulating our actions in relation to the social medium. Just as the motion of a planet may be resolved into a purely individual movement of rotation, and an orbital movement which it performs as member of a system, so the activities of the human mind are partly concerned with the individual alone, partly dependent on the presence of other members of a system. The latter class absorb by far the greater part of the total activity, and really constitute the chief differentia between the mind of man and that of animals, comprising those altruistic impulses which are the highest development of our activity, as is well shown in Spencer's "Principles of Psychology"; but, like all recent highly developed faculties, they do not appear in the individual completely formed at first, but in a germinal state, requiring training and exercise to bring them to the condition of full perfection; and because of their difficult development are more prone to suffer degeneration. This notion forms the foundation of the theories of education and of insanity, the latter showing that when the higher functions fail to be developed, or fall into abeyance, their place is taken by less developed faculties, which preceded them in order of evolution; or, to return to the analogy employed above, the rotatory gains at the expense of the orbital movement. This view of faculties of higher and lower faculties, *i.e.*, of greater and less perfection, and their somewhat mutual opposition, is essentially the same as Spinoza's theory of ethics. It is the key-note of the present volume, the substance of which consists of the attempt to show its existence in nature.

If the execution of the book were as satisfactory as its conception, it would indeed deserve most unqualified praise; but it is impossible not to feel, on perusal of the work, that in many respects there is much shortcoming, leaving room for further improvement, the aim not being realised owing to the difficulty of the passage from the abstract to the concrete. For though the highest generalities appear correct, are clearly stated, and well enforced, yet there is much dearth of the less general laws—the "middle propositions" which Bacon describes as of such importance in understanding the details of a subject, and of such value in practice—the absence of which is acknowledged by the author, when he says that we do not at all know why the disease should present different aspects in different cases. Also, different parts of the book are of unequal value, the best decidedly being those devoted to pure psychology and mental pathology, in which varieties of character, morbid tendencies, and the various motives, impulses, feelings, &c., are discussed, the author finding abundant occasion to display his talents as a moralist and eloquence as a writer. Next in order of merit come the sections on the phenomena and treatment of insanity; the former of these, though clear, correct, and tolerably full, do not add much to what has been written by previous observers. Lastly comes the physical aspect of the subject, which seems decidedly weak; for though this is undoubtedly most obscure, yet there is much repetition of somewhat crude theories of the correspondence of physical with psychical states. The general pathology, too, is but feebly represented; it may, perhaps, be no worse than is usual in modern text-books, but its usefulness is greatly impaired by want of those invaluable "middle propositions" which are created by clinical genius and communicated by tradition.

The first chapters are new, and are devoted to the consideration of sleep, dreaming, somnambulism, hypnotism, &c., which, being states analogous to insanity, though more open to observation, might be looked to for illustration and explanation of the leading problems of the disease,

e.g., its nature and genesis. In this way, the author approaches the subject of delusion, which really, in its widest sense, may be said to constitute the essence of insanity; this problem is twofold: 1. What is the primary *mental* deviation? 2. On what bodily disturbance does this depend? The intellectual is shown to be convertible into and dependent upon emotional disturbance; and it is well demonstrated how much our state of feeling—whether temporary as mood, or permanent as character—influences not only the imagination, but even perception. A delusion may be regarded as a picture formed to suit a certain frame of mind. In showing how incorrect figures arise from morbid feelings, the author is less explicit; he adopts the sensationalist or association theory, but a clearer notion might probably be afforded by a more Platonic or idealistic theory of cognition, of which there even is some suggestion once or twice. Although the author adopts the emotional source of delusion as a rule, yet he makes—rightly or not—exception in certain examples of hallucination, *e.g.*, those arising in connection with epilepsy, some toxic conditions, and in childhood—which he assigns to primary derangement of the sensory centres. Owing to the defective state of general pathology, as before stated, the mode of dependence of feeling on corporeal condition is far from being satisfactory. Next follow long chapters on the causation and prevention of insanity, treated first on the psychical, then on the physical, aspect; in both, much stress is laid on heredity as a factor: the former contains the most interesting and original parts of the work. The rest of the volume is of more special and technical character, being given to a tolerably full and accurate description of the disease, which is regarded as fundamentally the same in all cases, though wearing some variety of aspects, thus affording matter for classification; that here adopted is the same as in previous editions: the description commences with a chapter on the insanity of early life, and concludes with one upon treatment, on which the author holds rather sceptical opinions concerning the efficacy of drugs, especially narcotics.

In conclusion we may remark that, although the author may be considered to have attained success in his chief aim—the setting forth of the pathology of mind—yet no more than a mere outline has been accomplished, and much of this appears to have been derived from borrowed rather than purely original ideas, the chief originality of the author lying in their present application; and it is to be regretted that it is so lacking in thoroughness, for this may suffice to prevent an otherwise highly-readable and well-designed book from acquiring extensive adoption as a text-book and permanence as a work of reference.

LUBBOCK'S SCIENTIFIC LECTURES

Scientific Lectures. By Sir John Lubbock, Bart., M.P., D.C.L., LL.D., &c. (London: Macmillan and Co., 1879.)

THE six lectures of which this volume consists treat of the relations of insects and plants, the habits of ants, and prehistoric archæology. They are well illustrated by numerous woodcuts, and are written in the clear and pleasing style which characterises all Sir John Lubbock's works.

The first lecture—On Flowers and Insects—gives an excellent account of some of the more interesting cases of the special adaptation of flowers for insect fertilisation, but contains nothing that will be new to the readers of NATURE. The next—On Plants and Insects—introduces us to a variety of interesting and less generally known relations between the insect and vegetable worlds, which serve to confirm in a striking manner the general axiom, that the minutest details in the structure of living things, are or have been of use to them. We learn now how much of what gives a special character to many plants—their hairy or woolly stems, their spines, their glutinosity, the hairy rings inside their flowers, their drooping habit or glossy surfaces—are all of use in various ways to keep off insects which would rob them of their honey or pollen without effecting fertilisation. Another relation here dwelt upon is that of the colouring of caterpillars in accordance with the plants they feed upon, and it is particularly instructive as showing how impossible it is to decide whether a creature is protected by its colour unless it is observed in its native haunts. Few objects are more beautiful, or more varied in colour and markings, than the caterpillars of our different species of hawk-moths. They are often adorned with the most exquisite violet, blue, or white markings on a green ground, and sometimes also with ocellated spots of brilliant colours, yet in most cases these are so arranged and balanced as to harmonise with the general tints of the foliage and flowers of the food plant and thus render the insect quite inconspicuous at a little distance. In addition to the excellent woodcuts of caterpillars which illustrate this part of the work there is a coloured frontispiece which appears to have been added as an afterthought, for not only is there no reference to it in the text, but not even the names of the insects are given on the plate itself.

The next two lectures—On the Habits of Ants—give an excellent summary of those interesting researches by which Sir John Lubbock has added so much to our knowledge of these insects. Especially curious are the illustrations of the stupidity of some ants. One species is such a confirmed slave-owner that it dies of hunger if not fed by its slaves—a fact recorded by Huber and confirmed by our modern observer. Even more striking as an example of want of intellect is the experiment recorded at p. 81, where some ants went round a distance of ten feet to get at honey rather than jump down about one-third of an inch; and although they tried to reach this small height, from a little heap of earth to the glass on which the honey was placed, and could even touch it with their antennæ, yet they had not sense enough to pile up the earth a little higher but gave it up in despair and went round by the paper bridge ten feet in length!

Numerous experiments show that some sense analogous to smell, rather than vision, guides ants to their food, and thus no actual power of communication from one ant to another is needed to account for the numbers that follow when one has found out a store. Some very ingenious experiments prove, however, that an actual communication does exist when larvæ are concerned, and that one ant is able to tell its fellows whether there are few or many larvæ to be attended to. The experiments as to the effects of coloured light on ants are interesting, showing